

! FINDPATTERNS on PIR\*\* allowing 0 mismatches

use → GCHY ck: 206 len: 180 | glucagon precursor - golden hamster  
 1 accession HADGSFSDEMNT(M,L,I,V,C)LD(A,S,T,P,G,N,D,E,Q)LA(A,S,T,P,G) (H,R)DFINNL(M,L,I,V,  
 1 to match HADGSFSDEMNT(M,L,I,V,C)LD(A,S,T,P,G,N,D,E,Q)LA(A,S,T,P,G) (H,R)DFIN  
 146: ELGRR HADGSFSDEMNT(IILD(S)LA(T)(R)DFINNL(I)(Q)TKITD-  
 alignment HADGSFSDEMNT(IILD(S)LA(T)(R)DFINNL(I)(Q)TKITD-  
 to dictn HADGSFSDEMNT(IILD(S)LA(T)(R)DFINNL(I)(Q)TKITD-  
 matching portion of dictn

1 GCGP ck: 106 len: 158 | glucagon precursor - pig (fragment)

HADGSFSDEMNT(M,L,I,V,C)LD(A,S,T,P,G,N,D,E,Q)LA(A,S,T,P,G) (H,R)DFIN

HADGSFSDEMNT(V)LD(N)LA(T)(R)DFINNL(I)(H)TKITD

1 GCGP ck: 629 len: 180 | glucagon precursor - guinea pig  
 HADGSFSDEMNT(M,L,I,V,C)LD(A,S,T,P,G,N,D,E,Q)LA(A,S,T,P,G) (H,R)DFIN  
 HADGSFSDEMNT(IILD(N)LA(T)(R)DFINNL(I)(Q)TKITD  
 HADGSFSDEMNT(IILD(N)LA(T)(R)DFINNL(I)(Q)TKITD RK

1 GCHU ck: 9749 len: 180 | glucagon precursor [validated] - human

HADGSFSDEMNT(M,L,I,V,C)LD(A,S,T,P,G,N,D,E,Q)LA(A,S,T,P,G) (H,R)DFIN

HADGSFSDEMNT(IILD(N)LA(A)(R)DFINNL(I)(Q)TKITD  
 HADGSFSDEMNT(IILD(N)LA(A)(R)DFINNL(I)(Q)TKITD RK

1 GCRT ck: 9106 len: 180 | glucagon precursor - rat

HADGSFSDEMNT(M,L,I,V,C)LD(A,S,T,P,G,N,D,E,Q)LA(A,S,T,P,G) (H,R)DFIN

HADGSFSDEMNT(IILD(N)LA(T)(R)DFINNL(I)(Q)TKITD  
 HADGSFSDEMNT(IILD(N)LA(T)(R)DFINNL(I)(Q)TKITD RK

Databases searched: PIR, Release 79.0, Released on 16Aug2004, Formatted on 7Oct2004

Total finds: 5  
 Total length: 95,216,763  
 Total sequences: 283,416  
 CPU time: 02:46.71

! IAA-SEQUENCE 1..0  
P1;GCHY - glucagon precursor - golden hamster.  
N;Contains: glicentin-related peptide; glucagon; glucagon-like peptide 1;  
C;Species: *Macrourus auratus* (golden hamster)  
C;Date: 13-Jun-1983 #sequence\_revision 13-Jun-1983 #text\_change 20-Mar-1998  
C;Accession: A01539  
R;Bell, G.I.; Santerre, R.F.; Mullerbach, G.T.  
Nature 302, 716-718, 1983  
A;Title: Hamster preproglucagon contains the sequence of glucagon and two  
related peptides.  
A;Reference number: A01539; MUID:83167563; PMID:6835407  
A;Accession: A01539  
A;Molecule type: mRNA  
A;Residues: 1-180 <BEL>  
A;Cross-references: EMBL: J00059  
C;Superfamily: glucagon  
C;Keywords: amidated carboxyl end; carbohydrate metabolism; duplication;  
C;hormone; pancreas  
F;1-20/Domain: signal sequence #status predicted <SIG>  
F;21-80/Product: proglucagon #status predicted <PGC>  
F;21-50/Region: glicentin-related peptide #status predicted  
F;53-81/Product: glucagon #status predicted <GCN>  
F;88-127/Product: glucagon-like peptide 1 #status predicted <GL1>  
F;146-180/Product: glucagon-like peptide 2 #status predicted <GL2>  
F;127/Modified site: amidated carboxyl end (Arg) (amide in mature form from  
following glycine) #status Predicted

GCHY Length: 180 December 27, 2004 13:06 Type: P Check: 206 ..

1 MKNYYIVAGF FCGAGQGSWQ HSLQDTEKS RSFPASQTD P LEDPDQINED  
51 KRHSQGTFPS DYSKYLDSRR AQDFVQWLMN TKRNRYNIAK RHDERFHAE  
101 GTFTFSDVSSY LEGQAAKERTI AWLVKGRRGRR DPFPEEVTEV EIGRRHADGS  
151 FSDEMENTILD SLATRDFINW LIQTKITDKK

! IAA-SEQUENCE 1.0  
 F1;GCPG - glucagon precursor - pig (fragment)  
 N;Alternate names: glicentin, oxyntomodulin  
 N;Contains: glicentin, oxyntomodulin  
 C;Species: Sus scrofa domesticus (domestic pig)  
 C;Date: 17-Dec-1982 #Sequence revision 31-Mar-1993 #text\_change 20-Mar-1998  
 C;Accession: A01540; A60312; A91781; B32614; A28064  
 R;Tim, L.; Moody, A.J.  
 Regul. Pept. 2, 139-150, 1981  
 A;Title: The primary structure of porcine glicentin (proglucagon).  
 A;Reference number: A94233; MUID:61248172; PMID:6694800  
 A;Accession: A01540  
 A;Molecule type: protein  
 A;Residues: 1-69 <PML>  
 R;Tim, L.; Moody, A.J.  
 Regul. Pept. Suppl. 2, S33, 1983  
 A;Title: Primary structure of a possible porcine proglucagon fragment.  
 A;Reference number: A60312  
 A;Accession: A60312  
 A;Molecule type: protein  
 A;Residues: 1-30 <PML>  
 A;Note: this peptide is co-secreted with glucagon from the pancreas  
 R;Bromer, W.W.; Sim, L.G.; Behrens, O.K.  
 J. Am. Chem. Soc. 79, 2807-2810, 1957  
 A;Title: The amino acid sequence of glucagon. V. location of amide groups, acid  
 degradation studies and summary of sequential evidence.  
 A;Reference number: A91781  
 A;Accession: A91781  
 A;Molecule type: protein  
 A;Residues: 35-61 <PRO>  
 R;Orskov, C.; Bersani, M.; Johnsen, A.H.; Hojrup, P.; Holst, J.J.  
 J. Biol. Chem. 264, 12826-12829, 1989  
 A;Title: Complete Sequences of glucagon-like peptide-1 from human and pig small  
 intestine.  
 A;Reference number: A92732; MUID:932738; PMID:753890  
 A;Accession: B32614  
 A;Molecule type: protein  
 A;Residues: 70-107 <ORS>  
 R;Buhi, T.; Tim, L.; Kofod, H.; Orskov, C.; Harling, H.; Holst, J.J.  
 J. Biol. Chem. 263, 8621-8624, 1988  
 A;Title: Naturally occurring products of proglucagon 11-160 in the porcine and  
 human small intestine.  
 A;Reference number: A28064; MUID:88243712; PMID:3379036  
 A;Accession: A28064  
 A;Molecule type: protein  
 A;Residues: 111-158 <BUH>  
 C;Comment: X's represent missing amino acids, mostly basic, that are predicted  
 to exist in proglucagon before cleavage after basic residues.  
 C;Superfamily: glucagon  
 C;Keywords: amidated carboxyl end; carbohydrate metabolism; duplication;  
 hormone; intestine; pancreas  
 F1-69/Product: glucagon-69 #status experimental <G69>  
 F1-30/Region: glicentin-related peptide #status experimental  
 F1-33-69/Product: glucagon-37 #status predicted <G37>  
 F1-33-61/Product: glucagon #status experimental <G3N>  
 F1-78-107/Product: glucagon-like peptide 1 #status experimental <GL1>  
 F1-126-158/Product: glucagon-like peptide 2 #status experimental <GL2>  
 F1-07/Modified site: amidated carboxyl end (Arg) (amide in mature form from  
 following glycine) #status experimental  
 GCPG Length: 158 December 27, 2004 13:06 Type: P Check: 106 ..  
 1 RSLQNTTEKS RSFPPQDTP LDDPDQMTED KERHSQGFTPS DYSKVLDSRR  
 51 AQDFEWLMLN TKNRNNIAX XXXXXXXHAE GFTFTSDVSSY LEGQIAKEFI  
 101 AWLVKGRGX DFPEEVTE ELGRRHADGS FSDEMNTVLD NLATRDPINW  
 151 LLHMKTD

use accession ID to match structure to alignment

1 IAA SEQUENCE 1..0  
 P1;GCGP;-, glucagon precursor - guinea pig  
 N;Alternate names: oxyntomodulin  
 N;Contains: glcinein-related peptide; glucagon; glucagon-37 (oxyntomodulin);  
 C;Species: *Carica papaya* (guinea pig)  
 C;Date: 30-Sep-1987 #sequence revision 31-Dec-1992 #text\_change 09-Jul-2004  
 C;Accession: A24856; A23849; A6023;  
 R;Saini, S.; Welsh, M.; Bell, G.I.; Chan, S.J.; Steiner, D.F.  
 FEBS Lett. 203, 25-30, 1986

A;Title: Mutations in the guinea pig preproglucagon gene are restricted to a specific portion of the prohormone sequence.  
 A;Reference number: A24856; MUID:8624818; PMID:3755107  
 A;Accession: A23849  
 A;Molecule type: mRNA  
 A;Residues: 1-180 <SEI>  
 A;Cross-references: UNIPROT:P05110; DDBJ:D00014; GB:N00014; NID:9220288;  
 PMID:BA00010.1; PID:9220289;  
 R;Huang, C.G.; Eng, J.; Pan, Y.C.E.; Hulmes, J.D.; Yallow, R.S.  
 Diabetes 35, 508-512, 1986  
 A;Title: Guinea pig glucagon differs from other mammalian glucagons.  
 A;Reference number: A23849; MUID:86165412; PMID:3956884  
 A;Accession: A23849  
 A;Molecule type: protein  
 A;Residues: 53-81 <HUA>  
 R;Conlon, J.M.; Hansen, H.F.; Schwartz, T.W.  
 Regul. Pept. 11, 309-320, 1985  
 A;Title: Primary structure of glucagon and a partial sequence of oxyntomodulin (glucagon-37) from the guinea pig.  
 A;Reference number: A60323; MUID:86017049; PMID:4048553  
 A;Accession: A60323  
 A;Molecule type: protein  
 A;Residues: 53-81 <CON>  
 A;Note: glucagon-37 was not completely sequenced  
 C;Superfamily: glucagon  
 C;Keywords: amidated carboxyl end; carbohydrate metabolism; duplication; hormone; pancreas  
 F;1-20/Domain: signal sequence #status predicted <SIG>  
 F;21-180/Product: proglucagon #status predicted <PGC>  
 F;21-50/Region: glcinein-related peptide #status predicted  
 F;53-89/Product: glucagon-37 (oxyntomodulin) #status experimental <G37>  
 F;81-81/Product: glucagon #status predicted <GCN>  
 F;98-127/Product: glucagon-like peptide 1 #status predicted <GL1>  
 F;146-178/Product: glucagon-like peptide 2 #status predicted <GL2>  
 F;127/Modified site: amidated carboxyl end (Arg) (amide in mature form from following glycine) #status predicted  
 GCGP Length: 180 December 27, 2004 13:05 Type: P Check: 629 ..  
 1 MKSVYFVAGL FIMLAQGSMQ RSLQDTEBKP RSVSASQDM LDDPDMNED  
 51 KRHSQGTFITS DYSKYLDSRR AQQPLKMLLN VKRNRRNIAK RHDERHAE  
 101 GTFPSDVSSY LEGQAKSPTI AMIVKGGRR DPEEEVAIE ELGRRHADGS  
 151 FSDENNTLID NLATRDFINW LIQTKTDRK

! IAA-SEQUENCE 1.0  
 P1;GCHU - glucagon precursor [validated] - human  
 N;Contains: glicentin; glicentin-related polypeptide (GRPP); glucagon;  
 glucagon-like peptide 1 (GLP1); glucagon-like peptide 2 (GIP2); major  
 proglucagon fragment; oxyntomodulin; truncated glucagon-like peptide 1 (tGLP1)  
 C;Species: Homo sapiens (man)  
 C;Date: 24-Apr-1984 #sequence revision 31-Mar-1993 #text\_change 09-Jul-2004  
 C;Accession: A24377; A4197; A30875; A32614; A01541; S23309  
 R;Whit, J.W.; Saunders, G.F.  
 Nucleic Acids Res. 14, 4719-4730, 1986  
 A;Title: Structure of the human glucagon gene.  
 A;Reference number: A24377; MUID:86259053; PMID:3725587  
 A;Accession: A24377  
 A;Molecule type: DNA  
 A;Residues 1-180 <WHI>  
 A;Cross-references: UNIPROT:P01275; GB:X03991  
 A;Reference number: A4197; MUID:83271477; PMID:6877358  
 A;Accession: A4197  
 A;Molecule type: DNA  
 A;Residues: 1-179 <BEL>  
 A;Cross-references: GB:W01515; NID:931777; PIDN:CA24759.1; PID:931778  
 R;Drucker, D.J.; Abu, S.  
 J. Biol. Chem. 263, 13475-13478, 1988  
 A;Title: Glucagon gene expression in vertebrate brain.  
 A;Reference number: A30875; MUID:88330860; PMID:2901414  
 A;Accession: A30875  
 A;Molecule type: mRNA  
 A;Residues: 1-180 <DRU>  
 A;Cross-references: GB:J04040; NID:9183269; PIDN:AA52567.1; PID:9183270  
 R;Orskov, C.; Bersani, M.; Johnsen, A.H.; Holjrup, P.; Holst, J.J.  
 J. Biol. Chem. 264, 12826-12829, 1989  
 A;Title: Complete sequences of glucagon-like peptide-1 from human and pig small  
 intestine.  
 A;Reference number: A92732; MUID:89327238; PMID:2753890  
 A;Accession: A32614  
 A;Molecule type: protein  
 A;Residues: 98-127 <ORS>  
 R;Thomsen, J.; Kristianien, K.; Brunfeldt, K.; Sundby, F.  
 FEBS Lett. 21, 315-319, 1972  
 A;Title: The amino acid sequence of human glucagon.  
 A;Reference number: A91373  
 A;Accession: A01541  
 A;Molecule type: protein  
 A;Residues: 53-81 <THO>  
 R;Trugita, A.; Takemoto, K.; Kamo, M.; Iwadate, H.  
 Eur. J. Biochem. 206, 631-636, 1992  
 A;Title: C-terminal sequencing of protein. A novel partial acid hydrolysis and  
 analysis by mass spectrometry.  
 A;Reference number: S23188; MUID:92298996; PMID:1606956  
 A;Accession: S23309  
 A;Molecule type: protein  
 A;Residues: 53-81 <TSU>  
 C;Comment: In pancreatic alpha-cells, proglucagon is processed to  
 glicentin-related polypeptide, glucagon, and major proglucagon fragment that is  
 further processed to glucagon-like peptide 1. In intestinal L cells,  
 proglucagon is processed to truncated glucagon-like peptide 1, glucagon-like  
 peptide 2, and glicentin that is partially further processed to  
 glicentin-related polypeptide and oxyntomodulin.  
 C;Genetics:  
 A;Gene: GDB:GCG  
 A;Cross references: GDB:119265; OMIM:138030  
 A;Map position: 2q36-2q37  
 A;Introns: 31/2; 85/2; 131/2; 179/2  
 C;Superfamily: glucagon  
 C;Keywords: amidated carboxyl end; carbohydrate metabolism; duplication;  
 F;1-20/Domain: signal sequence #status predicted <SIG>  
 F;21-180/Product: proglucagon #status experimental <PGC>  
 F;21-89/Product: glicentin #status experimental <GLN>  
 F;21-50/Product: glicentin-related polypeptide #status predicted <GRPP>

F;53-89/Product: oxyntomodulin #status experimental <OXN>  
 F;53-81/Product: glucagon #status experimental <GCN>  
 F;92-178/Product: major proglucagon fragment #status experimental <MPGF>  
 F;92-127/Product: glucagon-like peptide 1 #status experimental <GL1>  
 F;98-127/Product: truncated glucagon-like peptide 1 #status experimental <TGL>  
 F;146-178/Product: glucagon-like peptide 2 #status predicted <GL2>  
 F;127/Modified site: amidated carboxyl end (Arg) (amide in mature form from  
 following glycine) #status experimental  
 GCHU length: 180 December 27, 2004 13:06 Type: P Check: 9748 ..  
 1 MKSIVPVAGL FVMIQVGSMQ RSLQDTIKS RSFSAQADP LSDPQMDNED  
 51 KRHSQGFTS DSYKYLDSRR AQDFVQMLN TKRNRNIIAK RHDEFERRHAE  
 101 GIFTSDVSSY LEGQAAKEFI AMLVKGRGRF DFPEEVAIE ELGRRHADGS  
 151 FSDERMTIIL NIAARDFTIW LIQTKIDRK

! IAA-SEQUENCE 1.0  
 P1;GCRT - glucagon precursor - rat  
 N;Contains: glicentin-related peptide; glucagon; glucagon-like peptide 1;  
 glucagon-like peptide 2  
 C;Species: *Rattus norvegicus* (Norway rat)  
 C;Accession: A22655; A25190; A44198  
 R;Heinrich, G.; Gros, P.; Habener, J.F.  
 J. Biol. Chem. 259, 14082-14087, 1984  
 A;Title: Glucagon gene sequence: four of six exons encode separate functional  
 domains of rat pre-proglucagon.  
 A;Reference number: A22655; MUID:85054853; PMID:6094539  
 A;Molecule type: DNA  
 A;Accession: A22655  
 A;Cross-references: UNIPROT:P06883; EMBL:K02809  
 A;Note: the authors translated the codon TTG for residue 10 as Glu and ACC for  
 residue 59 as Pro  
 R;Mojsov, S.; Heinrich, G.; Wilson, T.B.; Ravazzola, M.; Orci, L.; Habener, J.F.  
 J. Biol. Chem. 261, 11880-11889, 1986  
 A;Title: Preproglucagon gene expression in pancreas and intestine diversifies  
 at the level of post-translational processing.  
 A;Reference number: A25190; MUID:86304324; PMID:3528148  
 A;Accession: A25190  
 A;Status: not compared with conceptual translation  
 A;Molecule type: mRNA  
 A;Accession: I-180 <MOJ>  
 R;Heinrich, G.; Gros, P.; Lund, P.K.; Bentley, R.C.; Habener, J.F.  
 Endocrinology 115, 2176-2181, 1984  
 A;Title: Preproglucagon messenger ribonucleic acid: nucleotide and encoded  
 amino acid sequences of the rat pancreatic complementary deoxyribonucleic acid.  
 A;Reference number: A44198; MUID:85051023; PMID:6548696  
 A;Accession: A44198  
 A;Status: preliminary  
 A;Molecule type: mRNA  
 A;Residues: I-180 <HE2>  
 A;Cross-references: GB:K02809; GB:K02810; GB:K02811; GB:K02812  
 C;Genetics:  
 A;Introns: 31/2; 85/2; 131/2; 179/2  
 C;Superfamily: glucagon  
 C;Keywords: amidated carboxyl end; carbohydrate metabolism; duplication;  
 hormone; pancreas  
 F;1-20/Domain: signal sequence #status predicted <SIG>  
 F;21-180/Product: proglucagon #status predicted <PGC>  
 F;21-50/Region: glicentin-related Peptide #status predicted  
 F;33-81/Product: glucagon #status predicted <GCN>  
 F;98-127/Product: glucagon-like peptide 1 #status predicted <GL1>  
 F;146-180/Product: glucagon-like peptide 2 #status predicted <GL2>  
 F;127/Modified site: amidated carboxyl end (Arg) (amide in mature form from  
 following glycine) #status predicted  
 GCRT Length: 180 December 27, 2004 13:07 Type: P Check: 9106 ..  
 1 MKTVYIVAGL FWLWQGSMQ HARQDTHENA RSFPASQTEP LEDPQINED  
 51 KRHSQGTFPS DYSKYLDSRR AQDFVOMLN TRRNTRNIAK RHDEFERHAB  
 101 GTFTSQDVSSY LIEQQAAKEFI AWLWKGRGRR DFFPEVAIAE ELGRRHADGS  
 151 FSDDMNTIJD NIATRDFENW LIQTKIKDKK